

Center for Exposure Assessment Modeling (CEAM)

2009 Annual Report

US EPA

National Exposure Research Laboratory

Ecosystems Research Division

Athens, Georgia

Introduction

The EPA Center for Exposure Assessment Modeling (CEAM) was established in 1987 to meet the scientific and technical exposure assessment needs of the United States Environmental Protection Agency (U.S. EPA) as well as state environmental and resource management agencies. CEAM provides proven predictive exposure assessment techniques for aquatic, terrestrial, and multimedia pathways for organic chemicals and metals.

Modeling Tools

CEAM provides tools for modeling contaminant movement and concentration in lakes, streams, estuaries, and marine environments, researchers can better understand how exposure to contaminants affects aquatic environments. Models that quantify the movement of subsurface water and provide inputs to subsurface contaminant transport models. Simulation provides insight into groundwater and contaminant behavior and quantitative assessments for environmental decision making. As well as multimedia models that predict how contaminants travel through the atmosphere, soil, surface water, and the organisms that inhabit these media. The multimedia approach to exposure modeling quantifies the impacts of contaminants as they travel through more than one of these environments. Lastly predicting the impacts of contaminated aquatic and terrestrial environments typically result in the bioaccumulation of chemicals within all trophic levels of an ecosystem. Software models provide tools for tracking the movement of contaminants through food chains and for estimating chemical impacts on exposed biota.

Summary of Modeling Tools Available from CEAM

The following tables provide a brief summary FY2009 downloads of the modeling tools that are available from the Center for Exposure Assessment Modeling. Keywords and number of times downloaded this past year are provided.

Surface Water Models

Model Name	Key Words	Downloads
EFDC	surface water, hydrodynamic, sediment-contaminant, eutrophication, rivers, lakes, reservoirs, wetlands, estuaries, coastal ocean regions, assessment, management, regulatory	633
EXAMS	aquatic biology, assessment, biology, chemistry, compliance, environmental effects, metals, NPS related, permits, pesticides, point source(s), rivers, streams, surface water, test/analysis	368
EXPRESS	przm, exams, exposure, shell	154
GCSOLAR	solar, photolysis, half-life, pollutant, aquatic, ozone	133
HSCTM2D	hydrology, sediment, contaminant, transport, finite element model, river, estuary	156
HSPF	assessment, biology, compliance, deposition, discharge, environmental effects, estuaries, hydrology, lakes, metals, monitoring, NPS related, NPDES, nutrients, permits, pesticides, point source(s), rivers, sediment, streams, surface water, test/analysis, TMDL related, toxicity	399
QUAL2EU	stream, lake, water, quality, pollutants, planning, non-point, waste, load	13
SWMM	aquatic biology, assessment, combined sewer, community, discharge, environmental effects, metals, NPS related, NPDES, point source(s), procedure, rivers, stormwater, streams, surface water, test/analysis, TMDL related	1
TMDL-USLE	TMDL, load, USLE, soil, sediment, loss, watershed, spreadsheet	2
Visual Plumes	surface, water, jet, plume, model, quality, contaminant, TMDL	233
WASP	aquatic biology, assessment, compliance, discharge, environmental effects, hydrology, metals, NPS related, NPDES, point source(s), surface water, test/analysis, TMDL related	185
WHAT IF	watershed, health, fish, habitat, macro-invertebrate, biodiversity, BASS, biomass, biota, aquatic ecosystem, MAHA, CVI, hydraulic, bankfull, flow, restoration, foodweb	130

Groundwater Models

Model Name	Key Words	Downloads
FEMWATER/LEWASTE	assessment, discharge, drinking water, environmental effects, groundwater, hydrology, metals, monitoring, pesticides, prevention, test/analysis	366
PRZM3	assessment, discharge, environmental effects, hydrology, land use management, metals, pesticides, surface water, test/analysis	688
WhAEM2004	assessment, discharge, environmental effects, groundwater, hydrology, model, process, risk, test/analysis, waste management	943

Food Chain Models

Model Name	Key Words	Downloads
ACE	acute, chronic, toxicity, concentration, exposure	251
BASS	BASS, fish, bioaccumulation, population dynamics, biomass dynamics, rivers, lakes, reservoirs, assessment, fishery, management, regulatory	104
FGETS	aquatic biology, assessment, chemistry, environmental effects, metals, monitoring, NPS related, point source(s), test/analysis, toxicity	95

Multimedia Models

Model Name	Key Words	Downloads
3MRA	multimedia, pathway, receptor, exposure, hazardous, waste, risk, assessment, HWIR	353
MINTEQA2	aquatic biology, assessment, compliance, metals, NPDES, permits, test/analysis	162
MMSOILS	multimedia, contaminant, fate, transport, exposure, model, risk, hazardous, waste	220
MULTIMED 1.01	assessment, chemistry, discharge, environmental effects, facilities, waste generation, groundwater, hydrology, lakes, risk, rivers, streams, surface water, test/analysis	406

TOOLS and DATA

Model Name	Key Words	Downloads
PEST	model, independent, parameter, estimation	106

Statistics

The figure below gives a historical perspective of the number of models distributed by the center. The Center continues to provide a vital service to the environmental community by making these tools readily available.

